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ABSTRACT

This pamphlet suggests ways to grow garden vegetables in common household containers. A chart of cultural requirements of common vegetables is accompanied by a teacher's guide discussing the process skills and understandings which can be taught using the minigarden technique. A vocabulary list, a list of materials and supplies, and the methods by which the materials could be used in various courses are also included. (CP)

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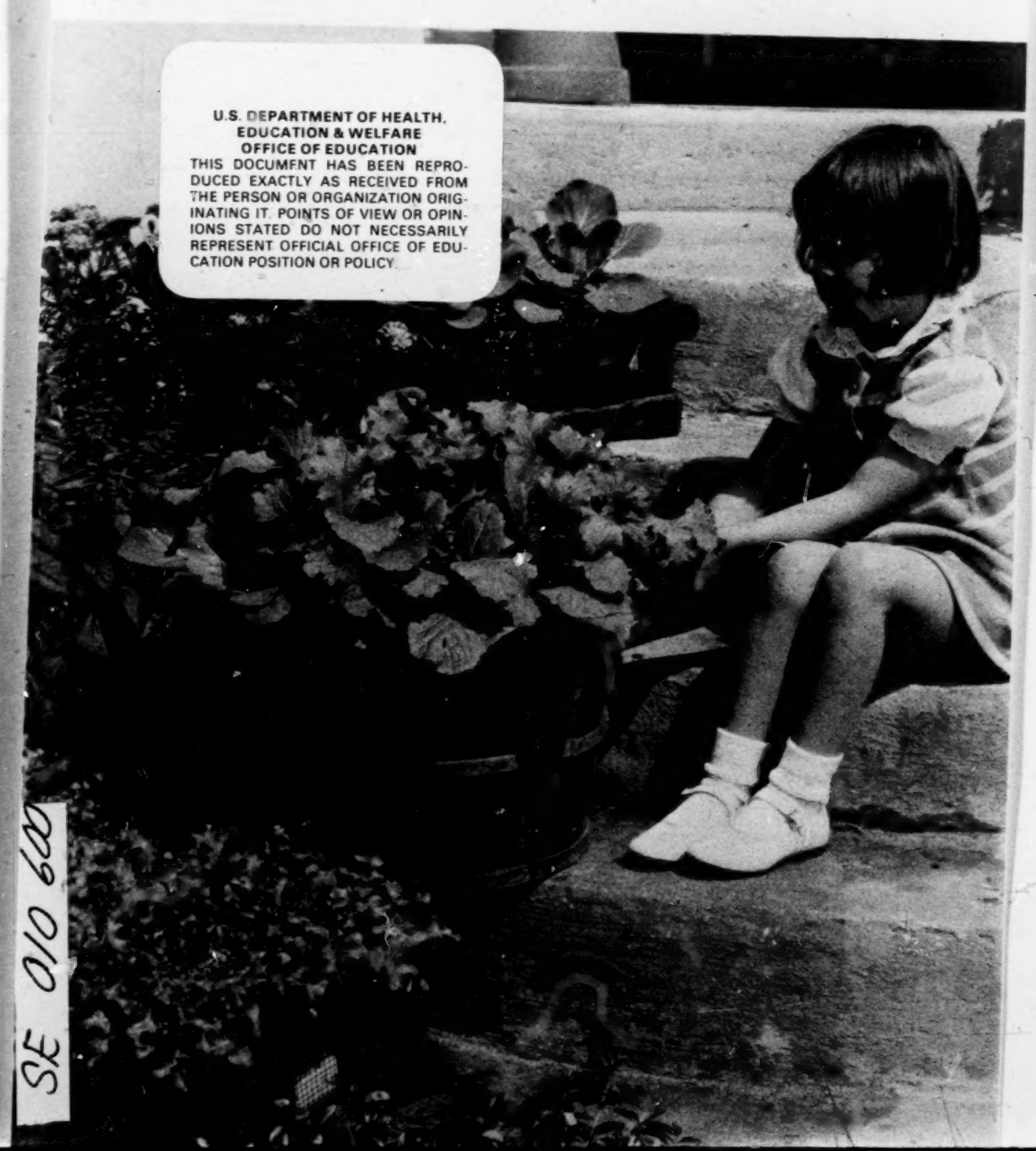
MINIGARDENS *for Vegetables*

U.S. DEPARTMENT OF AGRICULTURE ✿ HOME AND GARDEN BULLETIN NO. 163



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MINIGARDENS
for Vegetables

Information for this publication furnished by Crops Research Division, Agricultural Research Service

You'd like to be a gardener, but you live in a room, an apartment, or a townhouse—and you think you have no place for a garden. But if you have a windowsill, a balcony, or a doorstep you have enough space for a minigarden.

Growing vegetables in a minigarden can be fun for youngsters as well as for the not-so-young. You don't need to be familiar with growing plants—not if you have the patience to follow a few instructions.

The basic materials you will need for minigardening are some containers, some synthetic soil, and some seeds.

How to use this booklet

1. Look over the directions for each vegetable (pp. 8 to 11) and decide which ones you want to grow.
2. Study the section on containers and decide how many and what kind you have space for.
3. Read the instructions on soil preparation, seeds, planting, and plant care.
4. Collect your containers, fill them with a growth medium, plant the seed, and grow your vegetables.

CONTAINERS

To start a minigarden of vegetables, you will need a container large enough to hold the plant when it's fully grown. You can use plastic or clay pots, an old pail, a plastic bucket, a bushel basket, a wire basket, or a wooden box. Most any container is satisfactory—from tiny pots for your kitchen windowsill to large wooden boxes for your patio.

The size and number of the containers can vary with the space you have and the number of plants you want to grow. Six-inch pots are satisfactory for chives. Radishes, onions, and a variety of miniature tomato (Tiny Tim) will do well in 10-inch pots. For the average

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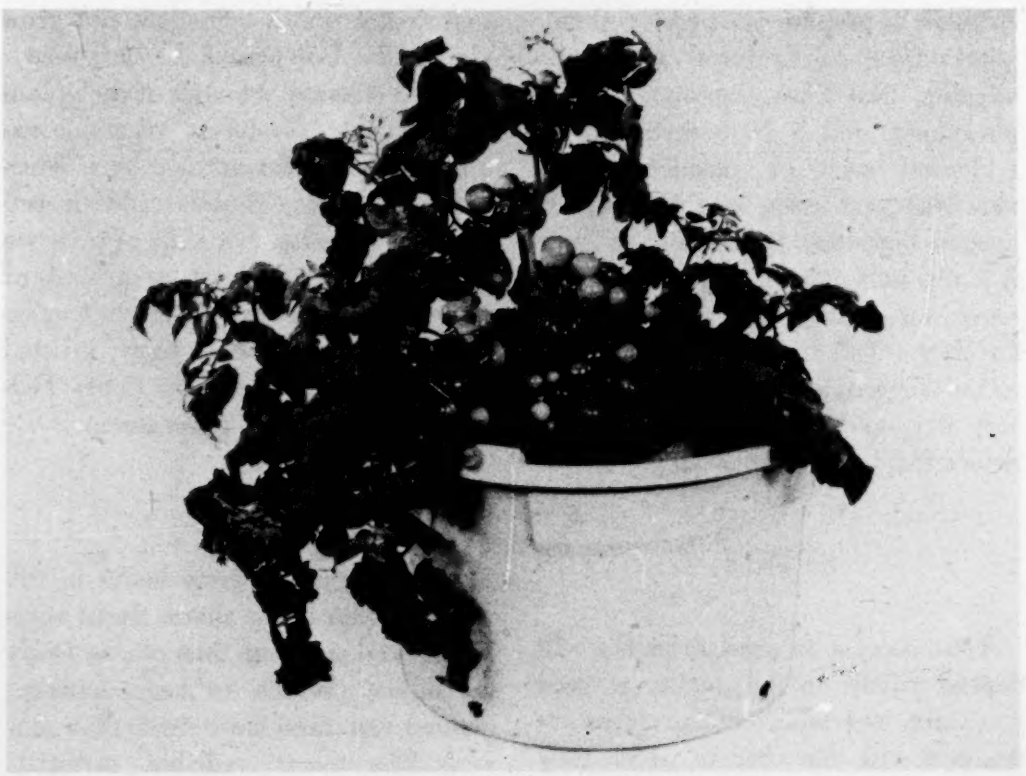
A half-bushel basket offers a good, light container for growing vegetables.



BN–35124

Tomatoes probably offer the largest edible return for your time and effort if you have a sunny spot.

patio, 5-gallon plastic trash cans are suitable. They are easy to handle and provide enough space for the larger vegetable plants. Half-bushel or bushel baskets also work well if you have room for them.

Readymade containers of plastic, metal, and wood are so widely available that it is not necessary to build your own containers. Many are designed especially for growing plants. Others can easily be modified for growing plants, particularly pails, tubs, baskets, and trash containers. Plastic laundry baskets, for example, are attractive and can be modified by lining them with plastic sheeting.

If you use solid plastic containers, allow for drainage. Drill four or more ¼-inch holes, spaced evenly along the sides, near the bottom. Don't drill the holes in the bottom itself. Then, to further help drainage, put about one-half inch of coarse gravel in the bottom of each container.

Wood containers, such as a bushel basket, will last 3 to 5 years if painted both inside and outside with a safe wood preservative.

SYNTHETIC SOIL

You can buy a soil substitute, or synthetic soil, prepared from a mixture of horticultural vermiculite, peat moss, and fertilizer. This mixture, sold by seed dealers and garden supply centers, comes ready to use. For minigardening it has several advantages over soil. It is free of plant disease organisms and weed seeds, it holds moisture and plant nutrients well, and it is very lightweight and portable.

You can prepare your own soil substitute from horticultural grade vermiculite, peat moss, limestone, superphosphate, and 5–10–5 fertilizer. To 1 bushel each of vermiculite and shredded peat moss, add 1¼ cups of ground limestone (preferably dolomitic), one-half cup of 20-percent superphosphate, and 1 cup of 5–10–5 fertilizer. This material should be mixed thoroughly. If the material is very dry, add a little water to it to reduce the dust during mixing.

SEEDS

Your success in minigardening will depend partly on the quality of seed you plant. Vegetable seed envelopes are stamped with the year in which they should be planted. So check the seed to see that it is not old. Old seed often germinates poorly and does not grow vigorously. Don't use last year's seed.

Seeds of many varieties of each plant are available. Miniature vegetable varieties are best for minigardens. When possible, select disease- and insect-resistant varieties. For a list of varieties recommended for your area, call or write your local Cooperative Extension Service office. The office usually is listed in the telephone directory under Federal, State, or local government.

LIGHT

Vegetable plants grow better in full sunlight than in the shade. Some vegetables need more sun than others. Leafy vegetables (lettuce, cabbage, mustard greens) can stand more shade than root vegetables (beets, radishes, turnips). Root vegetables can stand more shade than vegetable fruit plants (cucumbers,

BN–35125

Lettuce is a good minigarden crop. It is a fast-growing, cool-weather crop and can be grown in a small container without much sunlight.

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BN–35126

These lettuce seedlings are big enough to be transplanted into larger containers.

peppers, tomatoes), which do very poorly in the shade. Plant your vegetable fruit plants where they will get the most sun, and your leafy vegetables and root vegetables in the shadier areas.

PLANTING DATES

Planting or transplanting vegetables at the proper time helps insure success. The best planting date in one area may be days or weeks from the best date in another. This is because temperatures can differ greatly from one place to another—even a few miles apart. City temperatures, for example, are usually 5 to 10 degrees higher than those in the suburbs.

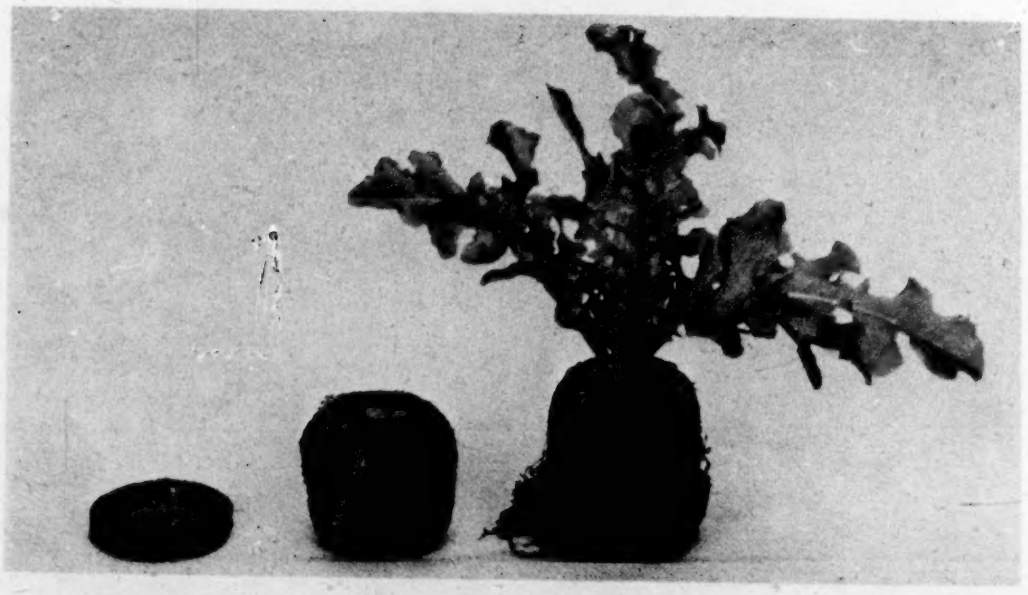
To follow the planting instructions given on pages 8 to 11, you need to know—for your locality—the frost-free date in the spring and the average date of the first killing frost in the fall. (The frost-free date in spring usually is 2 to 3 weeks later than the average date of the last freeze—about the date that oak leaves become full grown.) Your local Cooperative Extension Service agent can tell you the average frost-free dates in spring and fall for your locality.

STARTING PLANTS INDOORS

You can give some plants a jump on the growing season by starting them indoors on windowsills that have plenty of sunlight. Then after the weather gets warmer, you can transplant them into larger containers and move them outdoors.

Start your plants in small aluminum baking pans, plastic trays, pots, or cardboard milk cartons.

Use readymade peat pellets, or peat pots; both are available from garden



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Peat pellets are one of the best mediums for starting plants. Compressed pellet (left) is shown before water has been added. Moistened pellet (center) is shown with seedling in place. Plant growing from peat pellet (right) is ready to transplant to a larger container in which the plant will grow to harvest.

supply centers. Peat pellets contain synthetic soil that swells up several times its original size when water is added.

Clean your containers with hot soapy water, rinse them well, and fill them with the peat pots or the peat pellets. If you use the pellets, add water and wait until they expand.

Then make a planting hole with your finger or some tool to the correct depth for the kind of seed you are planting. Put in two or three seeds. Cover the seeds with peat moss and moisten with water. Then enclose the container in a plastic bag until the seedlings emerge. If more than one seedling comes up, pull out the less vigorous ones.

Transplant seedlings to larger containers when the first two leaves are fully developed. Water them thoroughly before transplanting. Be careful not to disturb the roots.

HARDENING

Plants should be gradually "hardened," or toughened, for 2 weeks before being moved outdoors. This is done by withholding water and lowering the temperature. Hardening slows down the plants' rate of growth to prepare them to withstand such conditions as chilling, drying winds, or high temperatures.

Lettuce, cabbage, and many other plants can be toughened to withstand frost; others, such as tomatoes and peppers, cannot be hardened.

DISEASES AND INSECTS

Vegetables grown in minigardens are as susceptible to attack by diseases and insects as those grown in a garden plot. This is especially true if they are grown near other plants. If attack occurs, consult your Cooperative Extension Serv-

ice agent, or obtain a copy of HG 46, "Insects and Diseases of Vegetables in the Home Garden." It is available for 30 cents by writing to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

FERTILIZER

Apply 1 level teaspoon of 5–10–5 fertilizer per square foot of soil about 3 weeks after the plants have reached the two-leaf stage and again every 3 weeks. Mix the fertilizer into the top one-half inch of soil and water thoroughly. This will keep your plants growing rapidly and producing well.

ST–4505–22

An old metal pail provides space for a pepper plant.

WATERING

Vegetables need a water supply equal to about 1 inch of rain every week during the growing season. Since you are gardening in containers instead of a garden plot, you can control moisture easily. Water each time the soil becomes dry down to a depth of one-eighth inch. Overwatering will slowly kill your plants. During hot, dry weather you may need to water three times a week.

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Plastic bags make excellent containers for starting plants.

If you use a sprinkler can, do not water so late in the evening that the leaves of plants stay wet at night. Wet leaves encourage plant diseases. It is important for you to fill the bottom of your plant containers with gravel or similar material. This allows for good drainage. If your soil becomes waterlogged, the plants will die from lack of oxygen.

CULTIVATING

Weeds rob plants of water, nutrients, space, and light. If weeds come up in your minigarden, pull them by hand or use a small hand weeder to loosen the soil and remove the weeds while they are still small. Be careful not to injure the roots.

Guide to cultural requirements of vegetables

Plant	*Light*	*When to plant*	*Days from seed to harvest*	*Space between plants (inches)*	*Planting depth (inches)*	*When to harvest*
BEETS	Tolerate partial shade.	2 to 4 weeks before frost-free date.	50 to 60	2 to 3	½	When 1 to 2 inches in diameter.
	Comment: Thin plants when 6 to 8 inches high; use thinnings for greens.					
CABBAGE	Tolerates partial shade.	Set out plants 4 to 6 weeks before frost-free date.	65 to 120, depending on variety.	12 to 18	½ (for seed); bury roots of plants.	When head is hard and rounded.
	Comment: Can also be set out for a fall crop.					
CARROTS	Tolerate partial shade.	2 to 4 weeks before frost-free date.	65 to 80	2 to 3	½	For small carrots, when ½ to 1 inch in diameter.
	Comment: To get several harvests, make plantings at 3-week intervals until 3 months before fall freezing date.					
CHIVES	Grow in partial shade, as in kitchen window.	Set out plants 4 to 6 weeks before frost-free date (can also be started from seed).	60 to 70	2 to 3 (in clusters).	½	Clip as needed for salads, toppings.
	Comment: Bulbs should be divided occasionally, so that they do not get too thick.					
CUCUMBERS	Require full sunlight.	Set out plants 1 week after frost-free date.	70 to 80	18	½ (for seed); bury roots of plants.	For best yield, pick before hard seeds form.
	Comment: Need hot weather. Use container of at least 5-gallon size. Start seeds in pots or berry boxes about 3 weeks before time to set out. During early growth, cover with a paper or plastic tent during cool nights.					

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EGGPLANT	Needs full sunlight.	Set out plants on frost-free date; they require warm soil.	100 to 140	One plant to a 3-gallon container.	½ (for seed); bury roots of plants.	When fruits are mature.

Comment: Hard to grow in northern part of U.S. because of high heat requirement and long growing season. Cover the plants during cool periods. You might want to try the new dwarf varieties. Start seeds indoors 8 to 9 weeks before transplanting time.

KALE	Tolerates partial shade.	6 to 8 weeks before first fall freeze.	55 to 70	6	½	When tall enough for greens; cut whole plants or take larger leaves.

Comment: Very winter hardy. Plant also in early fall for winter crops.

LEEK	Tolerates partial shade.	4 to 6 weeks before frost-free date.	130	2 to 3	½	When 1 inch in diameter and white part is 5 to 6 inches long.

Comment: Leek is a decorative and winter-hardy plant.

LEAF LETTUCE	Tolerates partial shade.	4 to 6 weeks before frost-free date and 6 to 8 weeks before first fall freeze.	30 to 35	4 to 6	¼	Cut leaves when large enough to use.

Comment: Lettuce is a cool-weather crop. It can be started inside early and set out even before frosts end. Plants will tolerate temperatures as low as 28° F. You can make several later plantings for summer lettuce unless hot weather hinders growth.

Guide to cultural requirements of vegetables—Continued

Plant	*Light*	*When to plant*	*Days from seed to harvest*	*Space between plants (inches)*	*Planting depth (inches)*	*When to harvest*
MUSTARD GREENS	Tolerate partial shade.	2 to 4 weeks before frost-free date until 6 to 8 weeks before first fall freeze.	35 to 40	4 to 5	¼	When large enough to make greens.
Comment: Can be grown throughout the summer. You can make plantings at 10-day intervals for successive crops.						
ONIONS	Green onions grow in partial shade; mature bulbs need full sun.	Plant bulb sets 4 to 6 weeks before frost-free date.	100 to 120 (less time for green onions).	2 to 3	1 to 1½	When large enough for green onions (8 to 10 inches tall); after they dry out they are usable as cooking onions.
Comment: Onions like lots of moisture.						
PARSLEY	Does well in partial shade; will grow on kitchen windowsills.	Set out plants 4 to 6 weeks before frost-free date.	85	6 to 8	¼	Clip for garnish.
Comment: Sensitive to heat. Parsley seeds germinate slowly; soak them in water overnight before planting. Cover container for a few days after planting to keep soil moist. Start indoors if possible.						
PEPPERS	Require full sunlight.	Set out plants 1 week after frost-free date.	110 to 120	14 to 18	½ (for seed); bury roots of plants.	When peppers are 2 to 3 inches in diameter (depends on variety).
Comment: Require hot weather. If you start your own seeds indoors, plant 5 or 6 weeks before transplanting time. Allow one plant per 1-gallon container.						

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RADISHES (mild)	Do well in partial shade.	2 to 4 weeks before frost-free date.	25 to 35	1	½	When ½ to 1 inch in diameter.

Comment: Cannot withstand heat. The faster they grow, the better the quality. Be sure they get fertilizer at seeding time. Radishes are at their best for only a few days, so you may wish to make several plantings at 1-week intervals. You may also want to try the hotter, large, winter radishes, which need 75 days or more growing time and are planted to mature just before fall frost.

SUMMER SQUASH	Does best in full sunlight.	On frost-free date.	50 to 60	One plant per 5-gallon container.	1 to 2	Depends on variety; see your seed package.

Comment: Plant the bush types of this vegetable.

SWISS CHARD	Tolerates partial shade.	2 to 4 weeks before frost-free date.	30 to 40	4 to 5	½	When leaves are 3 inches or more in length.

Comment: Only one planting is necessary; new leaves replace the harvested leaves. Outer leaves may be harvested without injuring the plant. Each seed cluster contains several seeds.

TOMATOES	Require full sunlight.	Transplant on frost-free date (start seeds 5 to 7 weeks before transplanting).	55 to 100	One plant per 1- to 3-gallon container.	½ (for seed); bury roots of plants.	When tomatoes turn pink or almost red.

Comment: Dwarf tomatoes offer a large return for a small space. They need warm weather. The Tiny Tim and other dwarf varieties do well in containers.

TURNIPS	Tolerate partial shade.	4 to 6 weeks before frost-free date and 6 to 8 weeks before first fall freeze.	30 to 80 (30 days for greens).	3 to 4, when harvesting for greens.	½	Thin when large enough to make greens; leave others to mature (2 inches or more in diameter).

Comment: Turnips are a cool-season vegetable.

BN–33367

Chives do well in a kitchen window. They can be harvested as you need them all year long.

BN–35128

Radishes are the quickest and easiest crop to grow in a small space.

ORNAMENTAL VEGETABLES

If you want to grow ornamental vegetables, there are several attractive varieties that are pretty as well as tasty. Here are a few suggestions.

Salad Bowl lettuce produces many curled, wavy, bright-green leaves. If you want color in your lettuce, grow the *Ruby* variety. This is a beautiful, nonheading salad lettuce with fancy, frilled leaves that are bright red.

Another bright-red vegetable is a swiss chard variety called *Rhubarb.* It looks like rhubarb and is easy to grow.

A kale variety called *Flowering Kale from the Orient* has bright red and green leaves.

All tomato varieties are decorative. Tiny Tim, a miniature tomato, is an especially colorful plant that adds color and taste to any salad.

Cover: Growing vegetables in a minigarden can be fun for youngsters. BN–35122

Washington, D.C.

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Teacher's Guide to Minigardens

U.S. DEPARTMENT OF AGRICULTURE

Science Study Aid No. 2

This Science Study Aid, *Teacher's Guide to Minigardens*, suggests a program based on the inquiry and process approach. It outlines ways to use the USDA Home and Garden Bulletin 163, "Minigardens for Vegetables," as the basis for learning activities. It is especially adaptable to urban situations where space for plant growth is limited. It offers opportunities for the development of the following process skills:

1. Observing
2. Using time/space relationships
3. Using numbers
4. Measuring
5. Communicating
6. Classifying
7. Predicting
8. Inferring
9. Formulating hypotheses
10. Controlling variables
11. Interpreting data
12. Experimenting
13. Defining operations

UNDERSTANDINGS THAT MAY BE DEVELOPED

1. There are different kinds of soil: sandy, clay, loam, and humus.

2. Plants can grow in substitutes for soil.

3. Various plants require various amounts of light.

4. The growing media must be fertile and contain the proper proportions of nutrients.

5. There must be an adequate but not excessive amount of soil moisture.

6. The seed must be of high quality and appropriate to local climate.

7. There must be protection from crop pests and weeds.

Teacher's Guide to Minigardens was developed by Margaret Jackson, an elementary science specialist in the District of Columbia school system. She prepared it while working with scientists at the Agricultural Research Center at Beltsville, Md.

All Science Study Aids produced by the Agricultural Research Service are developed by teachers working with the research staff. All Science Study Aids are tested in the laboratory and in the classrooms of cooperating teachers throughout the country.

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SUGGESTED APPROACHES TO THE PROJECT

1. Trips to farms, markets, and other sources of our food supply.

2. Films, filmstrips, etc. on conservation of soil, water, and food.

3. Discussions of man's dependence on plants for food.

4. A study of climate and soil of the United States.

MATERIALS AND SUPPLIES

1. Various containers - old pails, plastic or clay pots, bushel baskets, plastic buckets, wooden box or any container large enough to hold the plant when it is fully grown.
2. Seeds - Consult Minigardens booklet.
3. Synthetic soil, top soil, potting mix.
4. Fertilizers - Consult Minigardens booklet.

SUGGESTED VOCABULARY

humus	fertilizer	vermiculite
mineral	insecticide	frost free
decay	loam	moisture
transplant	emerge	peatmoss
germinate	tolerate	life cycle
erosion	resource	

Develop meaning and understanding of words and phrases as needed for the completion of the project.

CORRELATION WITH OTHER SUBJECTS

A. *Social Studies*

1. Studying how man stores food for use.
2. Studying world regions - i.e. desert, jungle, etc.
3. Listing community helpers: Extension Service Agent, U.S.D.A., garbage collector, trash collector, etc.
4. Studying how the needs of the community are met: soil conservation, food preparation, marketing, water conservation, air pollution.
5. Map Study.

B. *Mathematics*

1. Measuring plant growth.
2. Measuring amounts of materials needed to construct minigardens.
3. Estimating and checking planting dates in various geographical regions.
4. Making graphs and charts.

C. *Language Arts*

1. Writing original stories of the project activities.
2. Recording daily progress of study and experiences.
3. Using references, supplementary books, journals, newspapers, etc.
4. Presenting group reports and discussions.

D. *Art*

1. Making a mural of activity.
2. Painting posters and slogans for community involvement.
3. Planning displays for P.T.A.
4. Making paper sculpture and clay containers.

BIBLIOGRAPHY

Free single copies of the following publications are available from the Office of Information, U.S. Department of Agriculture, Washington, D.C. Send your request on a post card. Include your ZIP code in your return address.

1. *Suburban and Farm Vegetable Gardens* – Home and Garden Bulletin 9.
2. *Plant Hardiness Zone Map* – Miscellaneous Publication 814.
3. *Home Propagation of Ornamental Trees and Shrubs* – Home and Garden Bulletin 80.
4. *Indoor Gardens for Decorative Plants* – Home and Garden Bulletin 133.
5. *Selecting and Growing House Plants* – Home and Garden Bulletin 82.

The following are related commercially available materials:

Elementary Science Study material (McGraw Hill)
Starting Seeds - Teacher's Guide
Growing Seeds - Teacher's Guide

Science Curriculum Improvement Study material (Rand McNally)
Organisms - Teacher's Guide
Life Cycles - Teacher's Guide

Books for Children
Plants in His Pack - Janice J. Beaty, Pantheon, 1964.
The First Book of Plants - Alice Dickenson, Watts, 1953.
The Amazing Seeds - Ross E. Huching, Dood and Mead, 1965.
Gardens Indoors - Bertha M. Parker, Harper & Row, 1961.

Many books on growing plants are available for children. Consult your school librarian.

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